This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A method of channel estimation in a wireless orthogonal frequency division multiplexed (OFDM) communication system ~~(700)~~, comprise~~s~~ing the steps of:

receiving a signal in ~~the~~ time domain;

applying a Fourier transform to said received signal to obtain a frequency domain signal including a plurality of sub-carriers;

estimating probabilities of coded bits for at least said plurality of frequency domain sub-carriers; and

performing channel coefficient estimation for at least said plurality of frequency domain sub-carriers ~~characterised in that~~

~~said step of performing channel coefficient estimation for each of said plurality of frequency domain sub-carriers uses~~ using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers.

2. (original) A method of channel estimation according to Claim 1, wherein said step of performing channel coefficient estimation for substantially each of said plurality of frequency domain sub-carriers uses channel coefficient estimation benefits from said channel coefficient estimates for substantially all the other frequency domain sub-carriers of said plurality.

3. (original) A method of channel estimation according to Claim 2, wherein said plurality of frequency domain sub-carriers comprises substantially all the sub-carriers of said frequency domain signal.

4. (original) A method of channel estimation according to Claim 1 further comprising repeating said steps of estimating probabilities and performing channel coefficient estimation so as to improve iteratively an accuracy of said channel coefficient estimates.

5. (currently amended) A method of channel estimation according to Claim 4, wherein ~~the~~ a kth channel coefficient estimation is substantially in accordance with the following equation:

$$H_k^{(p+1)} = \frac{\mathrm{P}\left(y_k \middle| x_k, H_k^{(p)}\right)\left[y_k \overline{x_k} - \sigma^2 \left(\Delta^{-1}\right)_k \tilde{H}^{(k)}\right]}{\mathrm{P}\left(y_k \middle| x_k, H_k^{(p)}\right)\left[|x_k|^2 - \frac{\sigma^2}{\upsilon^2} + \frac{\upsilon^2}{\gamma^2}\right]}$$

where $H_k^{(p+1)}$ is the (p+1)th estimate and $H_k^{(p)}$ the pth estimate of the channel coefficients, y_k is the received data corresponding to the transmitted data x_k, σ^2 is the channel noise variance, $\tilde{H}^{(k)}$ is the channel coefficient vector H with a 0 on the kth component and Δ^{-1}, υ^2 and γ^2 have the meanings indicated hereinabove.

6. (original) A method of channel estimation according to Claim 4, wherein the step of performing channel coefficient estimates comprises replacing previously estimated channel coefficients of said plurality of frequency domain sub-carriers with respective current channel coefficient estimates.

7. (original) A method of channel estimation according to Claim 4, wherein repeating said step of performing channel coefficient estimation comprises applying a cost function on an Expectation-Maximization algorithm on said plurality of frequency domain sub-carriers to improve said channel coefficient estimates.

8. (currently amended) A method of channel estimation according to Claim 7, wherein said step of performing a channel coefficient estimation includes calculating an auxiliary function, the method further ~~characterised~~ comprising ~~by~~ the step of:

performing a Maximisation process on said auxiliary function in substantially the following manner:

$$Q(H_m, H_m^{(p)}) = E_{x_m}\left[\log \mathrm{P}(x_m, y_m, \tilde{H}^{(m)} \mid H_m) \mid y_m, H_m^{(p)}\right]$$

9. (currently amended) A method of channel estimation according to Claim 4, wherein said step of performing a channel coefficient estimation ~~includes~~ comprises applying a forward-backward algorithm on said received signal to said plurality of channel coefficient estimates in which estimates are made in a first order of said plurality of frequency domain sub-carriers and subsequently estimates are made in a reversed order of said plurality of frequency domain sub-carriers so as substantially to equalise an estimation accuracy across said plurality of frequency domain sub-carriers.

10. (currently amended) A system for channel estimation in an~~A n~~ orthogonal frequency division multiplexed (OFDM) receiver, the system ~~for a method of channel estimation as claimed in any preceding Claim, and~~ comprising:

demodulation means for applying ~~said~~ Fourier transform to ~~said~~ a received signal to obtain ~~said~~ a frequency domain signal including a plurality of sub-carriers;

decoding means for decoding the received signal and estimating ~~said~~ probabilities of coded bits for at least said plurality of frequency domain sub-carriers; and

channel estimation means for performing channel coefficient estimation for each of said plurality of frequency domain sub-carriers using channel coefficient estimates for at least one other of said plurality of frequency domain sub-carriers.